

What to do about urinary stones?

Dear Patient,

Urinary stones are a common disease increasing in the U.A.E. as well as worldwide. Increasing body weight and change of lifestyle are thought to be the reasons for this. Every tenth person will have a stone at least once in his/her lifetime.

Urinary stones can occur in the whole of the urinary tract. Depending on where they are situated, they are called kidney stones, ureteric stones or bladder stones.

Bladder stones occur mostly when the bladder cannot be emptied regularly. This could for example happen with an enlarged prostate. Kidney and ureter stones occur mostly because of non-optimal diet or metabolic disorders. They are the subject of this brochure which will inform you about possible treatment options and prophylactic measures.

The therapy of kidney and ureter stones to date is in almost all cases minimally invasive, that means without any open surgery. The options range from a stone fragmentation from outside to endoscopic, or so call “keyhole” operations.

A stone is only a symptom of stone disease. You yourself can reduce the risk of stone formation. Depending on the composition of your stone, various prophylactic measures can be used.

We hope to provide you with a practical guide through this brochure.

Dr. Noor NP Buchholz, Visiting Urologist Specialist

Dr. Mohamed El-Howairis, Urologist Specialist

The City Hospital

Dubai UAE

1. Treatment options:

Details of the treatment options described in the following may vary depending on the individual situation for each patient. Your doctor may find that one or another treatment option is better suited in your individual case. Small stones can often be passed spontaneously with the help of drugs and increased fluid intake. Physical activity will support this. Uric acid stones can be dissolved with drug therapy.

If stones cannot be passed spontaneously, your Stone Team will have the following treatment options at hand:

Extracorporeal Shockwave Lithotripsy (ESWL)

ESWL is a minimally invasive therapy option for the treatment of kidney and ureteric stones. The treatment is based on the fragmentation of a stone by shockwaves. Shockwaves are created outside the patient's body and are centred onto the stone inside the patient's body with the help of x-ray or ultrasound imaging. The fragments are then spontaneously passed with the urine.

The advantage of this option is the non-touch stone fragmentation with a low complication rate. Normally, this can be done without general anaesthetic. The patient will receive some painkillers before treatment. The duration of the treatment is in the range of about an hour.

Risks of ESWL are extremely low. Occasionally, there may be a small haematoma in the skin, a little bit of blood in the urine and in very rare cases a haematoma around the kidney. This is why we ask our patients to stop any blood thinning medication (i.e. aspirin or warfarin) 7-10 days before treatment.

Bigger stone fragments may get stuck in the ureter and block the kidney. Therefore, sometimes a plastic stent (JJ stent) has to be inserted before the ESWL treatment of larger stones to make sure that the kidney can drain freely into the bladder.

With a larger stones several treatments of ESWL may be needed.

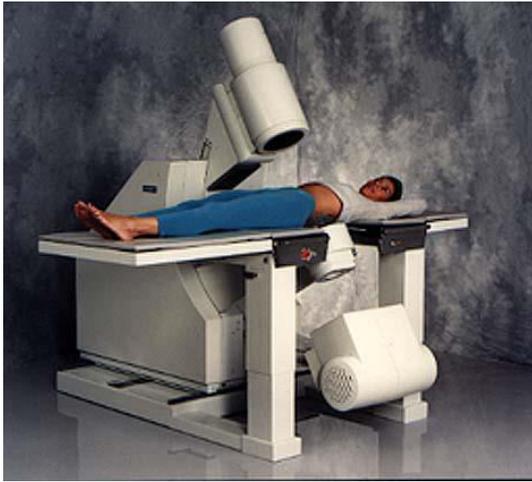


Fig1: Patient being treated on a modern ESWL machine

What should I do after the treatment?

After ESWL treatment you should drink more than normal and move around a lot. This will help the fragments to be washed out with the urine. If you can, you should sieve your urine in order to catch any stone fragments which we can then send to our laboratory for stone analysis. You will be followed-up in outpatient clinic to make sure that all the stones have been removed.

The treatment

- Outpatient treatment under painkillers only
- You can have a light meal a few hours before the treatment.
- You can have a light meal a few hours after the treatment.
- Normally you will be able to go home after the treatment.

(Flexible) Ureterorenoscopy

URS (ureterorenoscopy) means insertion of a very fine optical instrument directly into the ureter and kidney through natural openings. The instruments are equipped with a light source and a camera to make it possible to inspect the whole upper urinary tract.



Fig 2: A modern digital flexible ureterorenoscope

If stones are found, they can either be removed with special basket-like instruments or, if they are too large, be fragmented with a laser and then be removed.

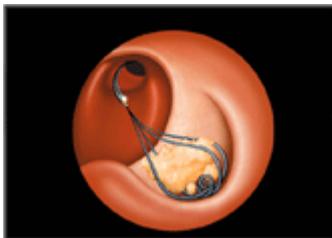


Fig 3: Basket removal of kidney stone (diameter 0.75 mm)

Since the instrument is introduced through natural openings, there is no scar remaining.

The advantage of this treatment option is the quick removal of smaller stones with a low risk. Depending on the size and the position of the stone within the urinary tract the operation can last between half and one hour. If the stones are very large, the operation may last longer. In almost all cases the stone can be removed in one treatment. URS is mostly done under general anaesthetic in order to make it pain free for the patient. It may be necessary after the operation to insert a plastic stent (JJ stent) which ensures the free flow of urine from the kidney down to the bladder whilst there may still be some swelling after the operation. The stent can usually be removed about two weeks later with a flexible cystoscopy, that is the insertion of a flexible

instrument under local anaesthetic into the bladder and removal of the stent. This, in itself, is done as an outpatient; it takes between two and five minutes.

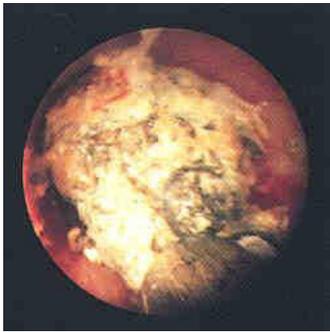


Fig 4: View of a kidney stone as seen through a ureteroscope

URS has a very low risk profile. Frequently, there will be a little bit of blood in the urine after the operation. This is however transient and will stop spontaneously. Occasionally, there can be some fever postoperatively which will need antibiotic treatment. Injuries of the ureter or the kidneys have become extremely rare with the new very thin and fine instruments.

The treatment:

- **Day case or short inpatient treatment.**
- **Usually general anaesthetic.**
- **No eating and drinking for six hours before the procedure.**
- **Hospital stay 0-2 days.**
- **Removal of a JJ stent after two weeks as an out patient under local anaesthetic.**

Percutaneous Nephrolithotomy (PCNL)

PCNL is the endoscopic minimally-invasive removal of kidney stones by direct puncture of the affected kidney through the skin. This procedure is done under general anaesthetic. The puncture is performed in the operating theatre with ultrasound or x-ray guidance. The puncture canal is widened with a balloon to about 1 cm which allows us to insert thin instruments directly into the kidney which then can fragment and remove the stones.

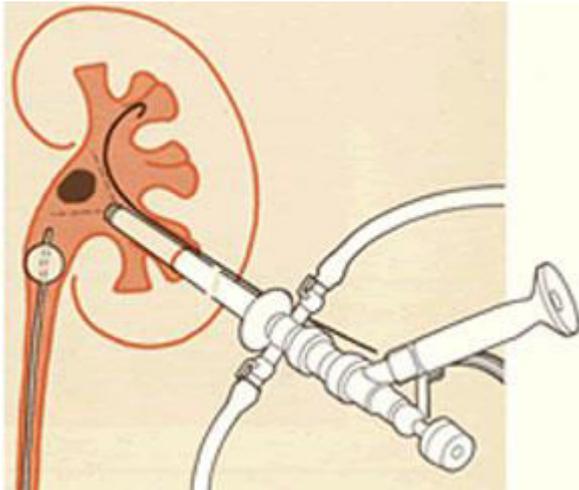


Fig 5: PCNL – puncture and access directly through skin into kidney

After the operation the kidney is usually drained for 1-2 days with a little tube coming out of the puncture site (nephrostomy) or down to the bladder with a plastic stent (JJ stent).

The advantage of PCNL is the quick and low-risk removal of larger stones from the kidney. Whilst treatment of larger kidney stones with ESWL requires usually more than one treatment, in most cases larger stone burdens can be removed from a kidney completely with one session of PCNL.

In principle, PCNL is a low-risk procedure. The puncture through the skin into the kidney will provoke some bleeding which usually stops spontaneously. If, in rare cases, there is major bleeding, this can be treated with selective closure of the bleeding vessel by the Radiologist. If fever occurs antibiotic treatment would be necessary. Serious injuries of the kidneys with our very fine instruments are extremely rare.

The treatment:

- **Procedure under general anaesthetic.**
- **Eat and drink a few hours after the operation.**
- **Hospitalisation 3-4 days.**

2. Prophylactic measures

The following prophylactic measures to avoid urinary stones have intentionally been kept quite general and should serve as a guide only. If stone formation recurs, a metabolic evaluation for risk factors will be performed which will include extensive blood sampling and the collection of 24 hour urine collections. On the basis of that an individually tailored drug and diet therapy can be recommended.

Calcium Oxalate Stones

About 70-75% of all urinary stones are calcium oxalate stones.

Risk factors:

- **Increased secretion of calcium in the urine (hypercalciuria) i.e. in hyperparathyroidism (dysfunction of the parathyroid gland).**
- **Increased secretion of oxalate in the urine when oxalate is increasingly resorbed from the bowel, i.e. Crohn's syndrome.**
- **Metabolic syndrome (high blood pressure, diabetes mellitus, increased cholesterol, increased uric acid).**
- **Concentrated urine by too little fluid intake.**
- **Decreased secretion of stone inhibitors in the urine, i.e. magnesium or citrate.**

General Prophylactic measures:

- **Increase of fluid intake to 2 ½-3 litres a day distributed equally over 24 hours.**
- **Sport/weight loss.**
- **Balanced diet:**
 - **Reduced intake of oxalate-rich food products (spinach, rhubarb, green leafy vegetables, cocoa, nuts)**
 - **Reduced protein intake (meat products)**

- **Reduced salt intake (avoid salt and processed foods such as ready made meals and tinned food).**
- **Normal calcium intake (do not avoid milk and milk products).**
- **Levelling the urinary pH to 6.5-7.0 (mineral water rich in bicarbonate, citrus fruits and citrus fruit juices, fruits in general, vegetables, salads)**

Stone prophylaxis with drugs

If stone formation recurs in spite of these dietetic and lifestyle measures, so called metabolic evaluation will be done by the Stone Team, which includes blood sampling and 24 hr collections. This will allow us to identify any specific risk factors that can be treated with drugs.

Uric acid stones

Uric acid stones occur in up to 10% of stone patients and are increasing in the western countries mainly due to dietary and lifestyle changes.

Risk factors:

- **Increased secretion of uric acid in the urine due to metabolic diseases or unbalanced diet with too much animal protein, alcohol and sometimes even following fasting.**
- **Low urinary pH below 6.**
- **Metabolic syndrome (high blood pressure, diabetes mellitus, high cholesterol, high uric acid).**
- **Concentrated urine through too little fluid intake**

General Prophylactic measures:

- **Increase fluid intake to 2 1/2-3 litres per day distributed equally over 24 hours.**
- **Sport/weight loss.**
- **Balanced diet:**

- **Reduced purin intake (meat, meat products, internal organs, soya products, pulses)**
- **Avoid alcohol.**
- **Reduce protein intake (meat, and meat products)**
- **Two meat free days per week.**
- **Increase intake of plant products (salads, vegetables, fruits)**
- **Levelling the urine pH to 6.8-7.2 (mineral water rich in bicarbonate, citrus fruits and citrus fruit juices).**

Prophylactic treatment with drugs:

If stone formation recurs in spite of these dietetic and lifestyle measures, so called metabolic evaluation will be done by the Stone Team, which includes blood sampling and 24 hr collections. This will allow us to identify any specific risk factors that can be treated with drugs.

Phosphate stones

In most cases phosphate stones occur with urinary tract infections or metabolic disorders. In infection-related stones, the early treatment of associated infections is important.

Risk factors:

- **Urinary tract infections.**
- **Increased calcium secretion in the urine if metabolic disorders are present (i.e. hyperparathyroidism).**
- **High urinary pH over 6.5, i.e. in metabolic disorders.**
- **Concentrated urine from too little fluid intake.**
- **Increased phosphate secretion or decreased magnesium secretion in the urine.**

General Prophylactic Measures

- **Increase fluid intake to 2 ½ -3 litres per day distributed equally over 24 hours.**
- **Sport/weight loss.**
- **Treatment of urinary tract infections.**
- **Balanced diet:**
 - **Reduction of phosphate intake (cheese, pulses, cocoa, nuts, liver)**
 - **Reduction of protein intake (meat and meat products)**
 - **Reduction of salt intake (salt and processed foods such as ready made meals and tinned foods)**
 - **Normal calcium intake (do not avoid milk and milk products.**
 - **Levelling of the urinary pH to 6-6.2 (mineral water rich in bicarbonate and sulphur, cranberry juice)**

Prophylactic treatment with drugs:

If stone formation recurs in spite of these dietetic and lifestyle measures, so called metabolic evaluation will be done by the Stone Team, which includes blood sampling and 24 hr collections. This will allow us to identify any specific risk factors that can be treated with drugs.

If stone formation occurs with chronic or recurrent urinary tract infections, a long-term low-dose antibiotic therapy may be needed.

Cystine Stones

The reason for the formation of cystine stones is a genetic metabolic disorder whereby an increased amount of the aminoacid cystine is secreted in the urine. Cystine is not soluble in urine and therefore these patients form frequent cystine stones.

General Prophylactic measures:

- **Increase fluid intake to 4-5 litres per day, equally distributed over 24 hours. This means also drinking and going to the toilet several times per night.**
- **The urine output should be more than 3 litres per 24 hours.**

- **Sport/weight loss.**
- **Reduction of salt intake (salt and processed foods such as ready made meals and tinned food).**
- **Alkalinisation of the urinary pH (mineral water rich in bicarbonate, citrus fruits and citrus fruit juices)**

Prophylactic measures with drugs

Since the above mentioned general prophylactic measures are usually not sufficient to prevent stone formation, an additional drug therapy is needed in almost all patients. The aim of the drug therapy is to level the urinary pH to above 7.5 since the solubility of the aminoacid cystine in urine significantly increases in this pH range. In addition, other specific drugs can be given.

Cystine stone patients are particularly high risk patients and should be followed up carefully and regularly.